Biomarkers Of Inflammation And Oxidative Stress In Patients With COPD And Healthy Smokers

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We measured urinary 8-isoprostane (IsoP), a biomarker of oxidative stress, and fractional exhaled nitric oxide (FeNO), a biomarker of airway inflammation, in 8 patients with COPD who were current smokers (COPD CS) (7/1 males/females, age 60±4 yrs, mean±SEM, FEV_1 65.8±4.8% pred), 9 patients with COPD who were ex-smokers (COPD ES) (7/2 males/females, age 66±3 yrs, FEV_1 50.6±3.6% pred), and 10 healthy smokers (HS) (9/1 m/f, 43±4 yrs, FEV_1 101.7±3.1% pred). We also measured prostaglandin (PG)E2, that can have pro- and anti-inflammatory effects, in sputum supernatants in 6 COPD CS (5/1 males/females, age 60±5 yrs, FEV_1 62.9±4.4% pred), 12 COPD ES (10/2 males/females, age 67±2 yrs, FEV_1 51.3±3.3% pred), and 4 HS (3/1 males/females, age 43±6 yrs, FEV_1 98.3±4.8% pred). Compared with COPD ES (268.0±28.8 pg/mg creatinine), urinary 8-IsoP was increased in COPD CS (506.1±85.6 pg/mg creatinine, $p<0.05$), but not in HS (385.9±52.2 pg/mg creatinine, p=ns), reflecting the higher degree of oxidative stress in COPD CS. FeNO was increased in COPD ES (24.8±6.0 ppb) compared with COPD CS (9.6±4.2 ppb, $p<0.04$) and HS (8.7±1.5 ppb, $p<0.04$) likely reflecting the inhibitory effect of smoking on endogenous NO production and/or increased NO breakdown due to free radicals. Compared with COPD ES (138.9±22.3 pg/ml), sputum PGE_2 was increased in COPD CS (308.0±96.6 pg/ml, $p<0.04$) and HS (385.5±134.6, $p<0.01$) indicating a stimulating effect of smoking itself on cyclo-oxygenase activity. Different biomarkers reflect different aspects of inflammation and/or oxidative stress in patients with COPD and healthy smokers.

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